A Case Study: Clear Creek Flood Damage and Ecosystem Restoration Study

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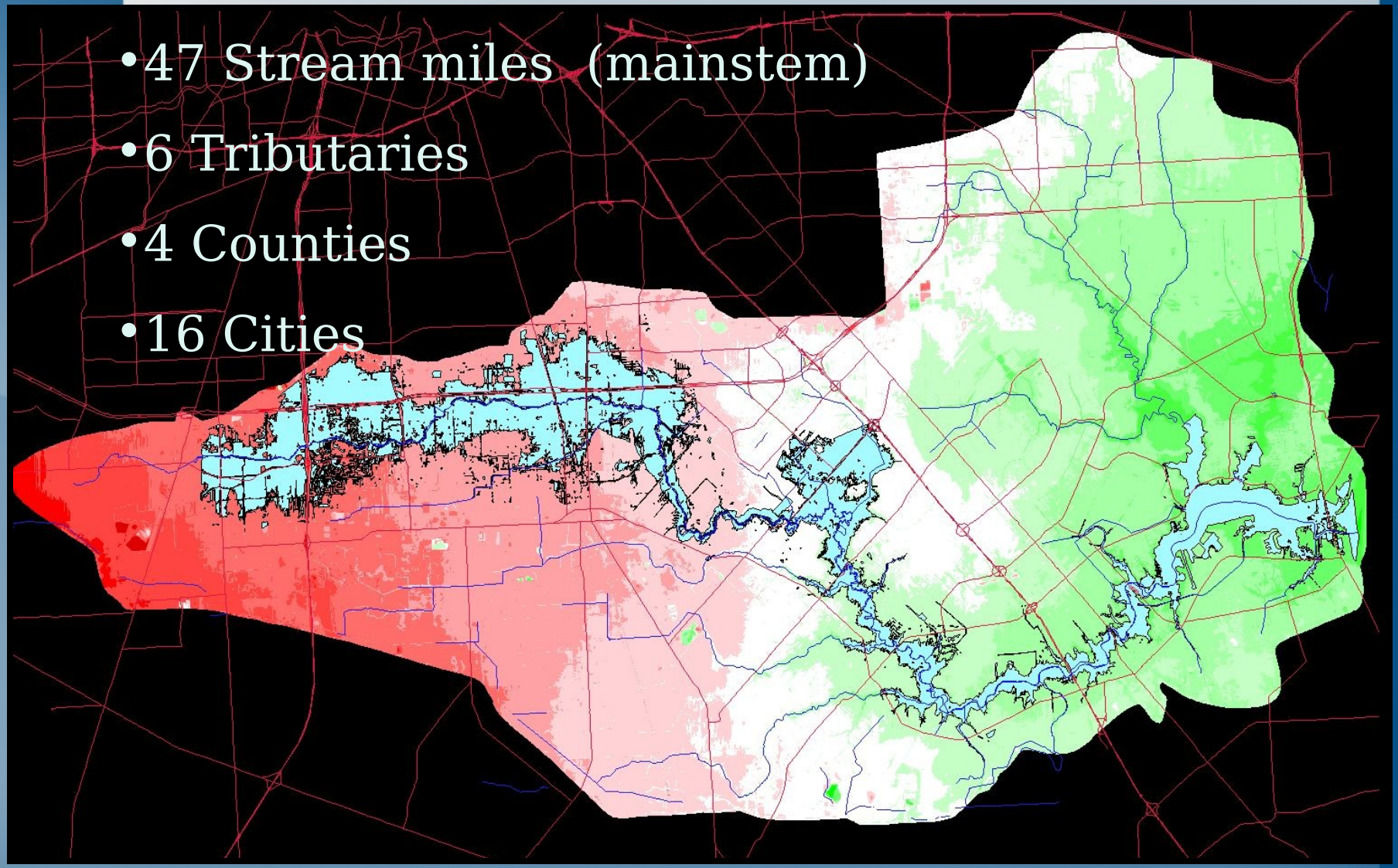
Clear Creek Study Area



Chronology & Background

1962-1986 – Iterations of study, restudy, plan recommendation and authorization culminated in a channelization project that addressed area flooding issues.

1991 & 1997 – Second Clear Lake Outlet Structure and Channel completed, respectively

1997 – Local Sponsor proposed alternative to authorized project due to public opposition

1999, Feb. – Corps determines General Reevaluation Report required due to change in scope

1999, June – Corps initiates General Reevaluation Report

2001 – Corps and Sponsors add tributaries and ecosystem restoration to study scope

Flooding Problems

Tropical Storm Claudette, July 19

Tropical Storm Allison, June 200

Flooding in 1944

Environmental Problems

1993

1944

2000

2002

Degraded Wet Prairie

Lost Forest

Subsided Tidal Marsh

Study Goals

- Reduce riverine flood damages
- Maximize economic benefits
- Mitigate environmental impacts
- Preserve or mitigate cultural resource impacts
- Recognize existing aesthetic quality of Clear Creek
- Identify recreational opportunities
- Identify opportunities for ecosystem restoration

Interagency Coordination Team (ICT)

- Corps of Engineers
- US Fish and Wildlife Service
- National Marine Fisheries Service
- Environmental Protection Agency
- Natural Resources Conservation Service
- Texas Commission on Environmental Quality
- Texas Parks and Wildlife Department
- Sponsors

Habitat Evaluation Procedure

- Thoroughly document the quantity and quality of habitat within the project area
- Measure non-monetary outputs (benefits) of ecosystem restoration alternatives
- Measure impacts of flood damage reduction alternatives
- Develop mitigation plans to offset impacts

Model Development Workshop

- March 2003
- Multi-Agency Team
- Facilitated by ERDC-Environmental Lab
- Using the Community Template, developed 3 Community Models
  - Floodplain Forest
  - Tidal Marsh
  - Prairie

Prairie Community Model

- Biotic Integrity
  - Invasives
  - Ratio Wet to Dry Prairie
  - Production, Recruitment, Stress
- Soil Stability
  - Loss of Soil Surface
- Hydrology
  - Water Flow
  - Infiltration

- Landscape
  - Patch Size
  - Core & Edge
  - Nearest Neighbor
  - Adjacent Landuse

Tidal Marsh Community Model

- Nekton Community
  - Resident
  - Non-Resident
  - Landscape
- Wildlife Community
  - Cover
  - Vegetation Diversity
  - Patch Size

Floodplain Forest Community Model

- Biotic Integrity
  - **Invasives**
  - **Structure**
  - **Substrate**
  - **Riparian Integrity**
- Hydrology
  - **Roughness**
  - **Sinuosity**
  - **Erosion Potential**
  - **Imperviousness**
- Landscape
  - **Patch Size**
  - **Core & Edge**
  - **Nearest Neighbor**
  - **Adjacent Landuse**

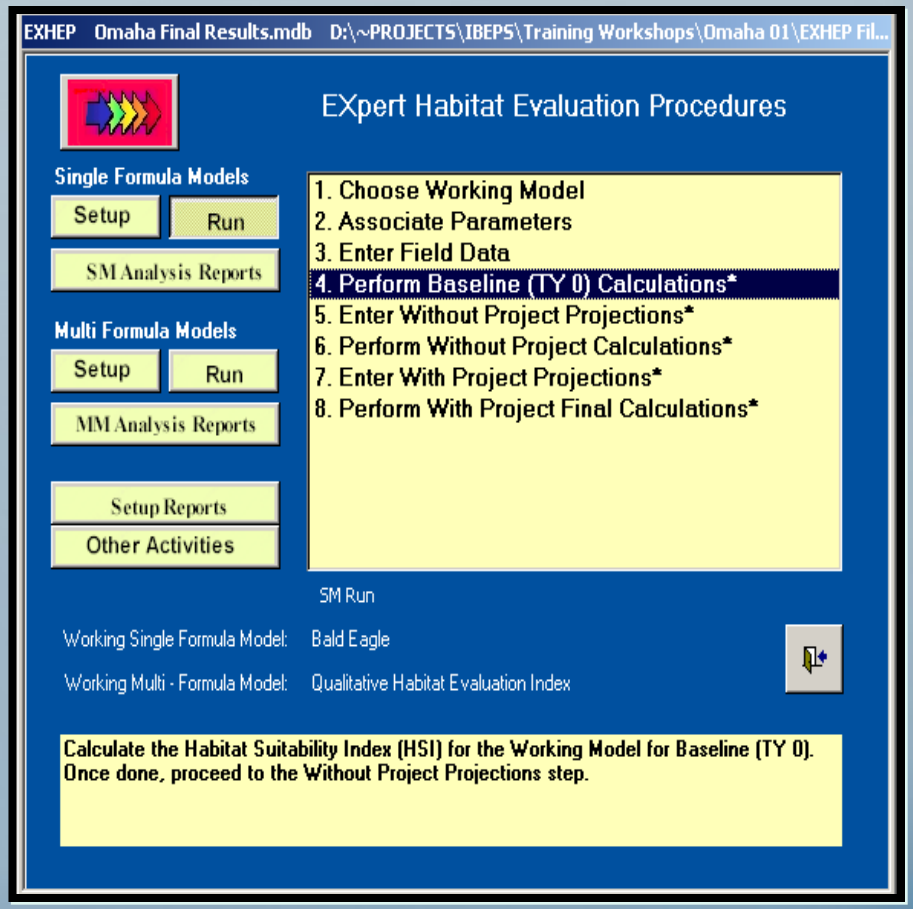
Baseline Sampling

Baseline Sampling

August-September 2003

EXHEP Software

- Quantifies conditions using standard HEP techniques
- Incorporates a broad range of HEP models
- Processes large amounts of data quickly and efficiently
- Reduces computation time
- Adapts to regional variation
- Accommodates a variety of data formats


EXHEP Omaha Final Results.mdb D:\~PROJECTS\IBEPS\Training Workshops\Omaha 01\EXHEP Fil...
EXpert Habitat Evaluation Procedures
Single Formula Models
Setup
Run
SM Analysis Reports
Multi Formula Models
Setup
Run
MM Analysis Reports
Setup Reports
Other Activities
1. Choose Working Model
2. Associate Parameters
3. Enter Field Data
4. Perform Baseline (TY 0) Calculations*
5. Enter Without Project Projections*
6. Perform Without Project Calculations*
7. Enter With Project Projections*
8. Perform With Project Final Calculations*
SM Run
Working Single Formula Model: Bald Eagle
Working Multi - Formula Model: Qualitative Habitat Evaluation Index
Calculate the Habitat Suitability Index (HSI) for the Working Model for Baseline (TY 0). Once done, proceed to the Without Project Projections step.

Status

- Baseline Analysis Complete
- Model Refinement Complete
- No Action Analysis Complete
  - Incorporated Census Trend Data from sub-watersheds

What's Next?

- Designs
- Impacts and Mitigation Decisions
- Ecosystem Restoration Opportunities
- Trade-Offs
  - Between Community Models
  - Among Reaches
  - NED vs. NER

Questions?